

Trend Study 11B-15-00

Study site name: Twin Hollow.

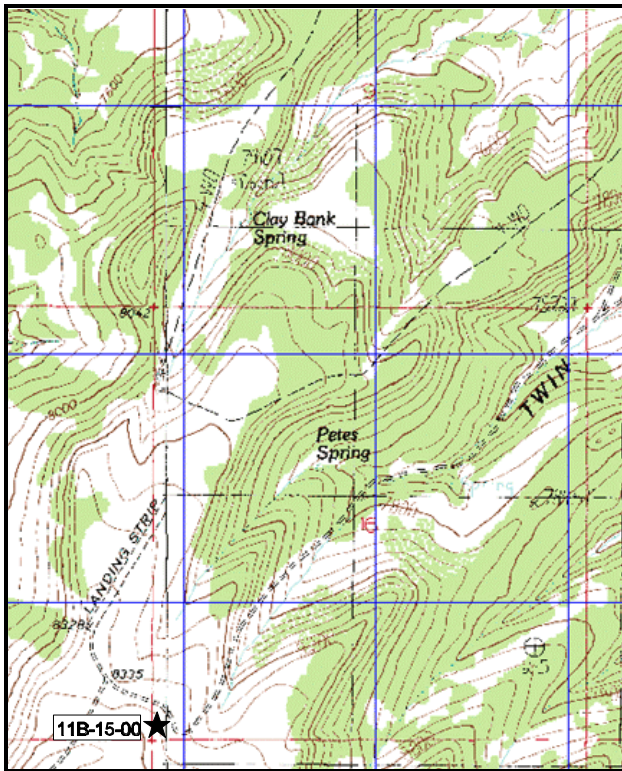
Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 197°M.

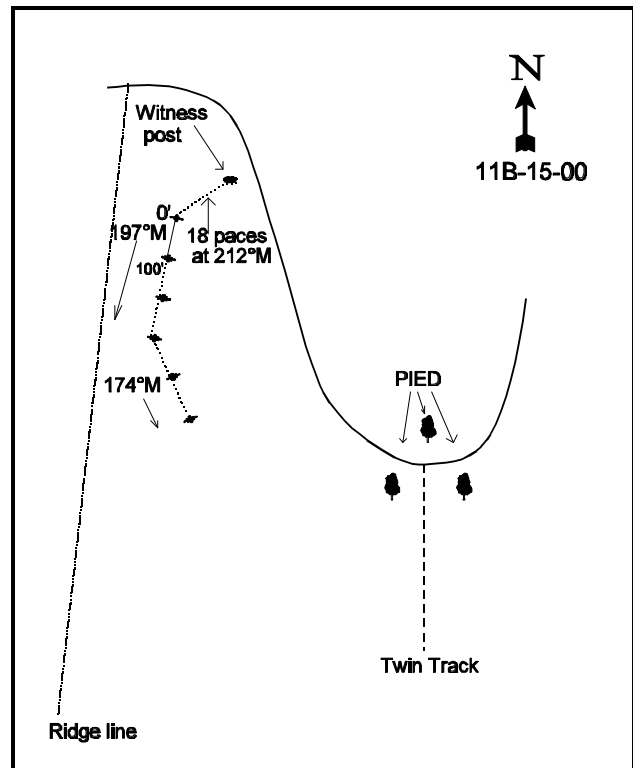
Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

On the Nine Mile Canyon road, continue 3.35 miles past the turn to Prickly Pear Canyon. Turn right (south) and drive up Cottonwood Canyon. Continue 1.7 miles to a cattle guard. Drive an additional 5 miles to a gate. At the gate turn right and drive 4.95 miles to a fork. Continue straight 1.5 miles to a Y intersection (left is twin track) On the south side of the intersection is a large lone pinyon pine tree. Continue on the main road another 0.1 mile to a witness post on the left side of the road. The 0 foot stake is 18 paces away at a bearing of 212°M.

Map Name: Bruin Point

Township 13S, Range 15E, Section 15



Diagrammatic Sketch

UTM. 4393183.655 N, 564281.231 E

DISCUSSION

Trend Study No. 11B-15 (32-21)

The Twin Hollow site was established in 1994 to monitor critical winter range for elk and a transitional range for deer in most winters. It samples a mountain brush type at an elevation of 7,900 feet, just off a small ridge with a slight southeast aspect. Slope is 23% to 25%. Pellet group transect data taken during the 2000 reading estimate 68 elk and only 5 deer days use/acre (168 edu/ha and 12 ddu/ha). Most of the elk pellet groups were concentrated on a ridge to the west of the study site baseline. The area is also utilized by a small band of wild horses with pellet group data estimating 12 horse days use/acre (30 hdu/ha) in 2000.

Soil on the site is moderately deep (the deepest of all 11B sites), but quite variable as evidenced by the presence of both black sagebrush and mountain big sagebrush. Average effective rooting depth is estimated at just over 17 inches. It is deeper along the first 200 feet of the baseline then becomes more shallow and rocky. Serviceberry and mountain mahogany dominate on the deeper soil, while black and mountain big sagebrush are much more numerous on the more shallow soil. The few mahogany and serviceberry found on the more shallow soil are stunted. Parent material is sandstone. Soil texture is a loam with neutral soil reaction (pH of 7.0). Phosphorus is limited at only 3.5 ppm, as values less than 10 ppm may have been shown to limit normal plant growth and development. There is little rock on the surface except for some gravel and large flat rocks predominately at the end of the baseline. There is little sign of erosion with a very high cover value for vegetation with excellent litter cover. Another positive characteristic of the vegetative cover is that over 40% of the cover is made up of herbaceous plants which protect the soils much better from high intensity summer storms.

The browse composition is good with 9 species sampled in 1994 and 2000. Serviceberry, mountain big sagebrush, and true mountain mahogany, provide 73% of the browse cover. All three species show light to moderate use, stable densities, low decadence, and generally good vigor. Poor vigor on serviceberry in 2000 was the result of very dry conditions which caused leaves to yellow and drop off prematurely. Leader growth in 2000 averaged about 10 inches for serviceberry, 13 inches for mahogany and 4 inches for mountain big sagebrush.

Black sagebrush is found in areas with more shallow soil and it appears that it is hybridizing with the mountain big sagebrush. Other common understory shrubs include: dwarf and stickyleaf low rabbitbrush, snowberry, and broom snakeweed. There are also a few bitterbrush on the site which are only lightly browsed.

The herbaceous understory composition is excellent with 44 species encountered in 1994 and 37 in 2000. Nine species of grasses were found, but only two, bluebunch wheatgrass, and Salina wildrye are abundant. These two grasses currently ('00) provide 83% of the grass cover. Forbs are diverse and provide nearly as much cover as grasses. Total forb cover was higher in 1994, but due to the extremely dry conditions in 2000, forb cover declined from 11% to 8%. Common forbs include bastard toad flax, sulfur eriogonum, and desert phlox which currently ('00) provide 76% of the forb cover in 2000. No use was apparent on any of the grasses or forbs during the 2000 reading.

1994 APPARENT TREND ASSESSMENT

Even with the moderately high percent of bare ground (21%), with the high amounts of both litter cover and vegetative cover, trend for this site appears stable. Trend for the browse species also appears stable with high cover values, good diversity, excellent health, and vigor for all key species. The herbaceous understory is diverse, abundant, and in good condition.

2000 TREND ASSESSMENT

Trend for soil is slightly improved. Nested frequency of vegetation and litter declined slightly but cover of both increased. In addition, herbaceous cover increased slightly compared to 1994. Trend for the key browse species, serviceberry, mountain big sagebrush, and true mountain mahogany, is stable. Use on these shrubs is light to moderate, vigor is good, and decadence low. The populations have remained at similar densities compared to 1994. Trend for the herbaceous understory is down slightly. Even though cover of grasses increased since 1994 (9% to 13%), sum of nested frequency declined. However, the dominant grasses, bluebunch wheatgrass and Salina wildrye, did not change significantly in frequency. Due to the extremely dry conditions, cover and nested frequency of forbs declined. This trend should reverse itself with a return to normal precipitation patterns.

TREND ASSESSMENT

soil - up slightly (4)

browse - stable (3)

herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --

Herd unit 11B, Study no: 15

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
G	Agropyron spicatum	159	178	56	61	1.77	6.01
G	Carex spp.	9	5	4	2	.02	.15
G	Elymus cinereus	-	5	-	1	-	.15
G	Elymus salina	142	123	48	43	4.34	4.78
G	Koeleria cristata	24	*2	12	2	.19	.06
G	Oryzopsis hymenoides	7	-	4	-	.07	-
G	Poa fendleriana	62	58	24	21	1.33	.77
G	Sitanion hystrix	26	*3	9	3	.26	.04
G	Stipa columbiana	23	15	8	7	.57	.40
G	Stipa lettermani	57	*16	18	6	.74	.65
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		509	405	183	146	9.32	13.03
Total for Grasses		509	405	183	146	9.32	13.03
F	Androsace septentrionalis (a)	4	5	2	1	.01	.00
F	Arabis spp.	3	1	1	1	.00	.00
F	Arenaria fendleri	9	5	3	4	.06	.04
F	Astragalus convallarius	18	*1	9	1	.07	.00
F	Astragalus miser	1	-	1	-	.00	-
F	Aster spp.	24	*8	11	3	.18	.04
F	Astragalus spp.	11	2	6	1	.03	.03

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
F	Balsamorhiza sagittata	-	-	-	-	-	.03
F	Castilleja flava	36	*11	16	6	.15	.05
F	Chenopodium album (a)	2	-	1	-	.00	-
F	Chaenactis douglasii	15	*-	7	-	.04	-
F	Chenopodium spp. (a)	5	-	2	-	.01	-
F	Chenopodium fremontii (a)	7	-	3	-	.04	-
F	Comandra pallida	150	*201	53	75	2.10	3.40
F	Collinsia parviflora (a)	65	*10	26	6	.38	.08
F	Crepis acuminata	-	3	-	1	-	.03
F	Cryptantha spp.	-	1	-	1	-	.00
F	Erigeron eatonii	110	*18	43	8	.44	.11
F	Erigeron flagellaris	16	14	10	7	.18	.08
F	Erigeron spp.	-	5	-	3	-	.01
F	Eriogonum racemosum	54	*9	16	4	1.12	.07
F	Eriogonum umbellatum	150	115	50	53	2.83	1.30
F	Hymenoxys acaulis	-	1	-	1	-	.03
F	Hymenoxys richardsonii	5	-	3	-	.06	-
F	Ipomopsis aggregata	15	2	5	2	.07	.01
F	Linum lewisii	30	*-	12	-	.06	-
F	Lithospermum spp.	16	*8	9	3	.32	.18
F	Machaeranthera canescens	12	*-	7	-	.08	-
F	Machaeranthera grindelioides	30	2	11	1	.18	.03
F	Microsteris gracilis (a)	-	-	-	-	-	-
F	Oenothera spp.	33	*-	14	-	.36	-
F	Penstemon caespitosus	90	*-	31	-	.91	-
F	Penstemon spp.	3	*38	2	11	.01	.15
F	Penstemon watsonii	29	22	10	12	.25	.70
F	Phlox austromontana	50	58	18	22	1.11	1.65
F	Phlox longifolia	58	*27	23	12	.11	.21
F	Polygonum douglasii (a)	41	-	14	-	.07	-
F	Taraxacum officinale	4	8	2	4	.03	.04
Total for Annual Forbs		124	15	48	7	0.51	0.08
Total for Perennial Forbs		972	560	373	236	10.82	8.26
Total for Forbs		1096	575	421	243	11.33	8.35

* Indicates significant difference at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 11B, Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Amelanchier utahensis	25	35	4.98	7.68
B	Artemisia frigida	1	0	-	-
B	Artemisia nova	23	24	1.37	.73
B	Artemisia tridentata vaseyana	71	68	6.51	10.85
B	Cercocarpus montanus	41	41	6.06	6.55
B	Chrysothamnus depressus	16	20	.80	.19
B	Chrysothamnus viscidiflorus	84	47	1.26	.67
B	Gutierrezia sarothrae	27	14	.48	.12
B	Opuntia spp	2	1	-	-
B	Purshia tridentata	2	2	-	.38
B	Symphoricarpos oreophilus	52	45	2.41	2.78
B	Tetradymia canescens	2	0	.03	-
Total for Browse		346	297	23.93	30.00

BASIC COVER --

Herd unit 11B, Study no: 15

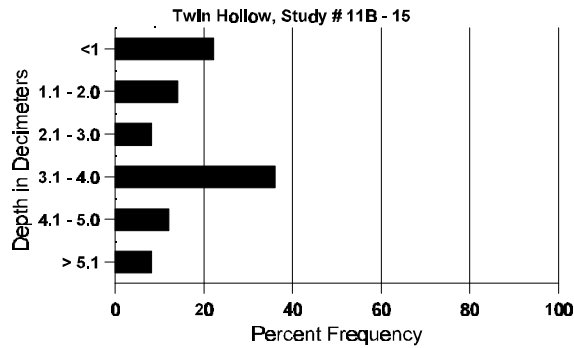
Cover Type	Nested Frequency		Average Cover %	
	'94	'00	'94	'00
Vegetation	427	392	42.89	48.85
Rock	174	66	2.13	1.44
Pavement	178	152	.41	2.82
Litter	486	476	44.90	62.65
Cryptogams	2	-	.00	0
Bare Ground	332	238	21.18	17.28

SOIL ANALYSIS DATA --

Herd Unit 11B, Study # 15, Study Name: Twin Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
17.13	61.8 (17.01)	7.0	44.0	31.4	24.6	4.6	3.5	291.2	0.7

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 11B, Study no: 15

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	00	00
Rabbit	5	1	191	N/A
Horse	4	4	139	N/A
Elk	11	13	887	69 (169)
Deer	5	5	61	5 (12)

BROWSE CHARACTERISTICS --

Herd unit 11B, Study no: 15

AGE	YR	Form Class (No. of Plants)										Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4	Ht. Cr.				
Amelanchier utahensis																			
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1	
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60				
Y	94	1	1	-	1	-	-	-	-	-	3	-	-	-	60			3	
	00	7	2	-	1	-	-	-	-	-	9	-	1	-	200				
M	94	51	4	-	-	-	-	-	-	-	55	-	-	-	1100	42	49	55	
	00	15	3	-	8	14	-	7	-	-	20	-	26	1	940	44	51	47	
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1	
	00	-	-	-	-	1	-	-	-	-	-	-	-	1	20				
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20				
% Plants Showing		<u>Moderate Use</u>				<u>Heavy Use</u>				<u>Poor Vigor</u>				<u>%Change</u>					
'94		10%				00%				00%				- 2%					
'00		34%				00%				50%									
Total Plants/Acre (excluding Dead & Seedlings)												'94	1180	Dec:	2%				
												'00	1160		2%				

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia frigida																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	20	Dec:	-	
														'00	0		-	
Artemisia nova																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	94	5	2	-	2	-	-	-	-	-	9	-	-	-	180			9
	00	3	1	-	-	-	-	-	-	-	4	-	-	-	80			4
M	94	26	4	-	1	-	-	-	-	-	31	-	-	-	620	11	13	31
	00	49	-	-	6	-	-	-	-	-	55	-	-	-	1100	10	14	55
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		15%			00%			00%			+31%							
'00		02%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	820	Dec:	2%	
														'00	1180		0%	
Artemisia tridentata vaseyana																		
S	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	94	32	1	-	3	-	-	-	-	-	36	-	-	-	720			36
	00	31	-	-	-	-	-	-	-	-	31	-	-	-	620			31
M	94	305	7	1	1	-	-	3	-	-	317	-	-	-	6340	16	17	317
	00	229	27	-	1	-	-	-	-	-	257	-	-	-	5140	16	22	257
D	94	3	3	2	3	1	-	-	-	-	7	-	-	5	240			12
	00	23	7	-	-	-	-	1	-	-	26	-	1	4	620			31
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		03%			.82%			01%			-13%							
'00		11%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	7300	Dec:	3%	
														'00	6380		10%	

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Cercocarpus montanus																		
S	94	17	-	-	-	-	-	-	-	-	17	-	-	-	340			17
	00	148	-	-	30	-	-	-	-	-	178	-	-	-	3560			178
Y	94	52	8	-	4	-	-	-	-	-	64	-	-	-	1280			64
	00	46	19	-	7	-	-	-	-	-	72	-	-	-	1440			72
M	94	27	22	-	1	-	-	-	-	-	50	-	-	-	1000	44	48	50
	00	24	8	1	2	12	2	2	-	-	50	-	1	-	1020	46	47	51
D	94	12	1	-	-	-	-	-	-	-	3	-	-	10	260			13
	00	1	-	-	1	1	-	-	-	-	2	-	-	1	60			3
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		24%			00%			08%			- 1%							
'00		32%			02%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	2540	Dec:	10%			
												'00	2520		2%			
Chrysothamnus depressus																		
Y	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	82	-	-	-	-	-	-	-	-	82	-	-	-	1640	5	6	82
	00	61	1	-	1	-	-	-	-	-	63	-	-	-	1260	3	5	63
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-24%							
'00		02%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	1700	Dec:	0%			
												'00	1300		3%			
Chrysothamnus viscidiflorus																		
Y	94	16	-	-	-	-	-	-	-	-	16	-	-	-	320			16
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	235	-	-	22	-	-	4	-	-	261	-	-	-	5220	8	7	261
	00	63	-	-	5	-	-	7	-	-	75	-	-	-	1500	11	10	75
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	4	-	-	-	-	-	-	-	-	-	-	-	4	80			4
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-72%							
'00		00%			00%			05%										
Total Plants/Acre (excluding Dead & Seedlings)												'94	5560	Dec:	0%			
												'00	1580		5%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Gutierrezia sarothrae																		
Y	94	7	-	-	1	-	-	-	-	-	8	-	-	-	160		8	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	59	-	-	-	-	-	-	-	-	59	-	-	-	1180	6	5	
	00	39	-	-	-	-	-	-	-	-	39	-	-	-	780	4	4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-42%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	1340	Dec:	-	
														'00	780		-	
Opuntia spp.																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	11	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			-50%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	40	Dec:	0%	
														'00	20		100%	
Purshia tridentata																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	18	40	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		00%			00%			00%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	40	Dec:	-	
														'00	40		-	
Symphoricarpos oreophilus																		
Y	94	7	-	-	1	-	-	-	-	-	8	-	-	-	160		8	
	00	12	-	-	-	-	-	-	-	-	11	-	1	-	240		12	
M	94	53	3	-	52	-	-	4	-	-	109	-	-	3	2240	12	19	
	00	43	-	-	10	-	-	9	-	-	61	-	1	-	1240	10	18	
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20		1	
	00	4	-	-	-	-	-	-	-	-	-	-	-	4	80		4	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'94		03%			00%			02%			-36%							
'00		00%			00%			08%										
Total Plants/Acre (excluding Dead & Seedlings)														'94	2420	Dec:	1%	
														'00	1560		5%	

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches)		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4		Ht.	Cr.	
Tetradymia canescens																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	7	2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	10	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'94			00%			00%			00%							
		'00			00%			00%			00%							
Total Plants/Acre (excluding Dead & Seedlings)												'94		40	Dec:	-		
												'00		0		-		